

4.4.1 Methodology for Schedule Development

Ernst & Young (E&Y) interviewed various members of Kaiser-Hill's (K-H) staff in order to better understand the methodology applied to develop the 2006 Closure Plan Baseline (CPB) Schedule. Understanding how the contractor developed the schedule enabled us to focus our review of the 2006 CPB Schedule and allows us to deliver more substantive feedback. The following summarizes the 2006 CPB Schedule development methodology as it was explained by K-H.

The 2006 CPB Schedule is the culmination of three previous closure schedules. When K-H was awarded the contract in 1995, the managers, analysts, and schedulers developed a high level, "top down" type of schedule called the Accelerated Site Action Plan (ASAP) that had incorporated approximately 1,600 schedule activities. Many, if not most, of these activities were single line items for large areas of work, but this cumulative schedule represented a baseline of the overall scope of work to achieve site closure by 2010.

The next schedule developed was the Life Cycle Baseline (LCB) schedule. This schedule included approximately 17,000 activities and provided a greater level of detail for the scope of work to achieve site closure. The LCB began to develop individual work plans for each building and the SNM removal process. This schedule was resource loaded and provided K-H with the information they needed to project staffing and personnel requirements as well as funding needs.

The LCB was then used by K-H and the four primary contractors on site (often referred to as the "Four Tops") to develop the 2010 Closure Plan Baseline (CPB) Schedule in late 1997 and early 1998. The 2010 CPB Schedule which was developed in Primavera Project Planner (P3) had approximately 27,000 activities at the time it was first published. In this schedule, K-H attempted to fully integrate all of the ongoing Special Nuclear Material operation programs with the activities required to achieve site closure. The organizational structure elements of the 2010 CPB Schedule are the Project Baseline Descriptions (PBDs), which are broken down into Work Authorization Documents (WADs), containing WADlets or Work Breakdown Structures (WBSs). The WADs and WADlets represent the individual projects that must be executed to achieve site closure and contain the individual activities that the contractor(s) will perform on a daily basis. This 2010 CPB Schedule was a detailed "bottom up" type schedule that was developed at the WAD and WADlet levels and "rolled up" to a summary level scope of work as documented in the PBDs. The 2010 CPB Schedule development began with the PBD managers, WAD managers, analysts and schedulers identifying the activities that were required to complete each Building Cluster Project and operational mission. These activities were then given durations by using a template of "quantity of work" based assumptions developed by K-H. Each quantity-based assumption was reviewed by a Subject Matter Expert (SME) for its appropriateness for each individual room or work area and subsequently the activity durations were modified to reflect the input of the SME.

As each WADlet and WAD was developed through the process noted above, the resources were entered into K-H estimating program Basis of Estimate Tool (BEST), which is part of K-H's project management software called Joshua. BEST then used this information to develop a cost of the work for

each activity within each WAD or WADlet. K-H indicated, as part of their fully integrated schedule, that every schedule activity has a corresponding item in the BEST program. These costs and resources were then downloaded back into the 2010 CPB Schedule. Concurrent with the loading of resources into BEST, the resource information was used to calculate the activity durations independent of BEST and P3. Some analysts have developed Excel spread sheets to calculate activity durations. However, this task does not appear to be consistent across the project nor are the productivity rates applied to calculate durations clearly documented in any of these management systems. P3 then spreads the costs and resources over the scheduled activities. However, P3 was not used to manage non-skilled resources, only to manage resources for Critical Skill Analysis (i.e., the hiring and training of personnel with SNM skills), and to provide a forecast over time. This cost and resource flow information is then downloaded back into the Joshua project management system and into a program called PIRS (Planning and Integration Reporting System).

The procedures listed above are still in use and were used in developing the 2006 CPB Schedule. The 2006 CPB Schedule is a revision to the 2010 CPB Schedule that has been accelerated in order to achieve site closure by 2006 instead of 2010. K-H has stated that the bulk of accelerated activities are focused in the Decontamination and Decommissioning areas. Additionally, the organizational structure of the 2006 CPB Schedule remains largely unchanged from the 2010 CPB, and K-H has begun to apply the “Rolling Wave” development methodology in accordance with K-H’s Standard 10 – Scheduling. K-H’s Standard Rolling Wave methodology requires that the current fiscal year and the next fiscal year be the most developed in detail and that the out years may reflect a lower level of detail. It has also been K-H’s policy to remove/archive all completed activities from the schedule at the end of a fiscal year in order to better manage the size of the schedule as it increases its level of detail through time. K-H indicated that this practice of archiving previous years would no longer be done starting with this fiscal year, 1999.

In addition to the P3 2006 CPB Schedule the following schedules also exist and are used for different purposes:

Schedule Document	Use
2006 Management Summary Schedule (MSS) – Revision 2.0	Presentation Tool
2006 Expanded Management Summary Schedule (EMSS) – Revision 2.0	Communication, integration, and Quality control/validation Tool
2006 Critical Path	Presentation Tool
Milestone Sequence Chart Revision 2.0	Presentation Tool
Rev. 7 (1/26/99) Baseline Resource Leveled/Unconstrained Funding/Planning In The Year Prior To Decommissioning/ Associated ER Activities Incorporated chart (“Eye-chart”)	Basis for Facility Disposition Cost Model

The above schedules are manually extracted from the P3 2006 CPB Schedule and should conform to the configuration controlled CPB except when displaying leading information to guide CPB development to be in accordance with the K-H’s Standard. In some cases the basis for the forecasts shown in the

“Eye-Chart” cannot be found in the P3 2006 CPB Schedule or the forecasts do not match the P3 version. Specific inconsistencies are outlined in Section 4.4. of this report.

The K-H Standard 10 – Scheduling also indicates the guidelines that should be followed in the development of the schedule and who is those responsible for the various aspects of the schedule. K-H Planning & Integration (P&I) designates a CPB scheduler to assist the Project Manager’s representative with developing, updating, and maintaining the 2006 CPB Schedule. The following is an excerpt from Standard 10 regarding schedule development.

P&I will provide scheduling assistance to the Project in creating a CPM which represents the plan of execution, while allowing the Project to focus efforts on planning and scheduling the work scope with decreased emphasis on the correct technical development of a CPM.

The Standard 17 Schedule Integration continues to state that the Site critical path shall represent a feasible plan, constrained by assumed levels of annual funding and since it is a resource constrained path; it is not the mathematical critical path through the overall project. The intent of developing a critical path method (CPM) schedule is to develop an integrated time time-phased plan to achieve the goals of the project. As the project progresses, the CPM schedule is updated to reflect the progress and events to date. When properly developed with appropriate logic, the CPM allows the project management team to foresee potential critical issues in time to address them before the project is impacted. Such CPM schedules allow for more reliable forecasting of work, resources and cashflow. It appears that the 2006 CPB Schedule does includes a significant amount number of constraints and unconventional logic ties (Start-to-Start or Finish-to-Start with excessive lags) which therefore may taint the true critical path. Our detailed comments relative to other K-H Standard 10 – Scheduling guidelines and the 2006 CPB Schedule development issues may be found in Sections 4.4.2 through 4.4.7 of this report.

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